FIG. 1

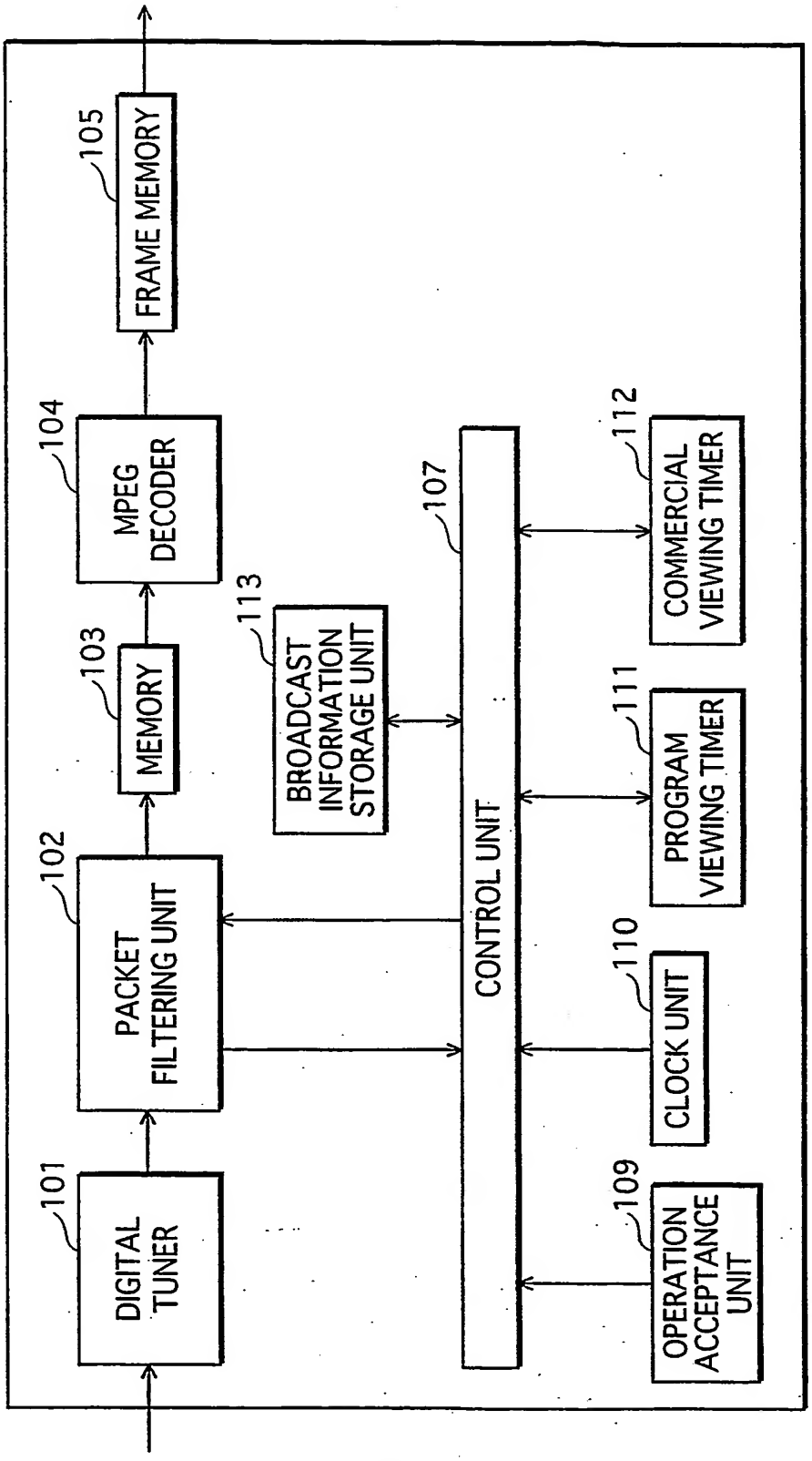

101
DIGITAL TUNER
102
PACKET FILTERING UNIT
103
MEMORY
104
MPEG DECODER
105
FRAME MEMORY
107
CONTROL UNIT
109
OPERATION ACCEPTANCE UNIT
110
CLOCK UNIT
111
PROGRAM VIEWING TIMER
112
COMMERCIAL VIEWING TIMER
113
BROADCAST INFORMATION STORAGE UNIT

FIG.2

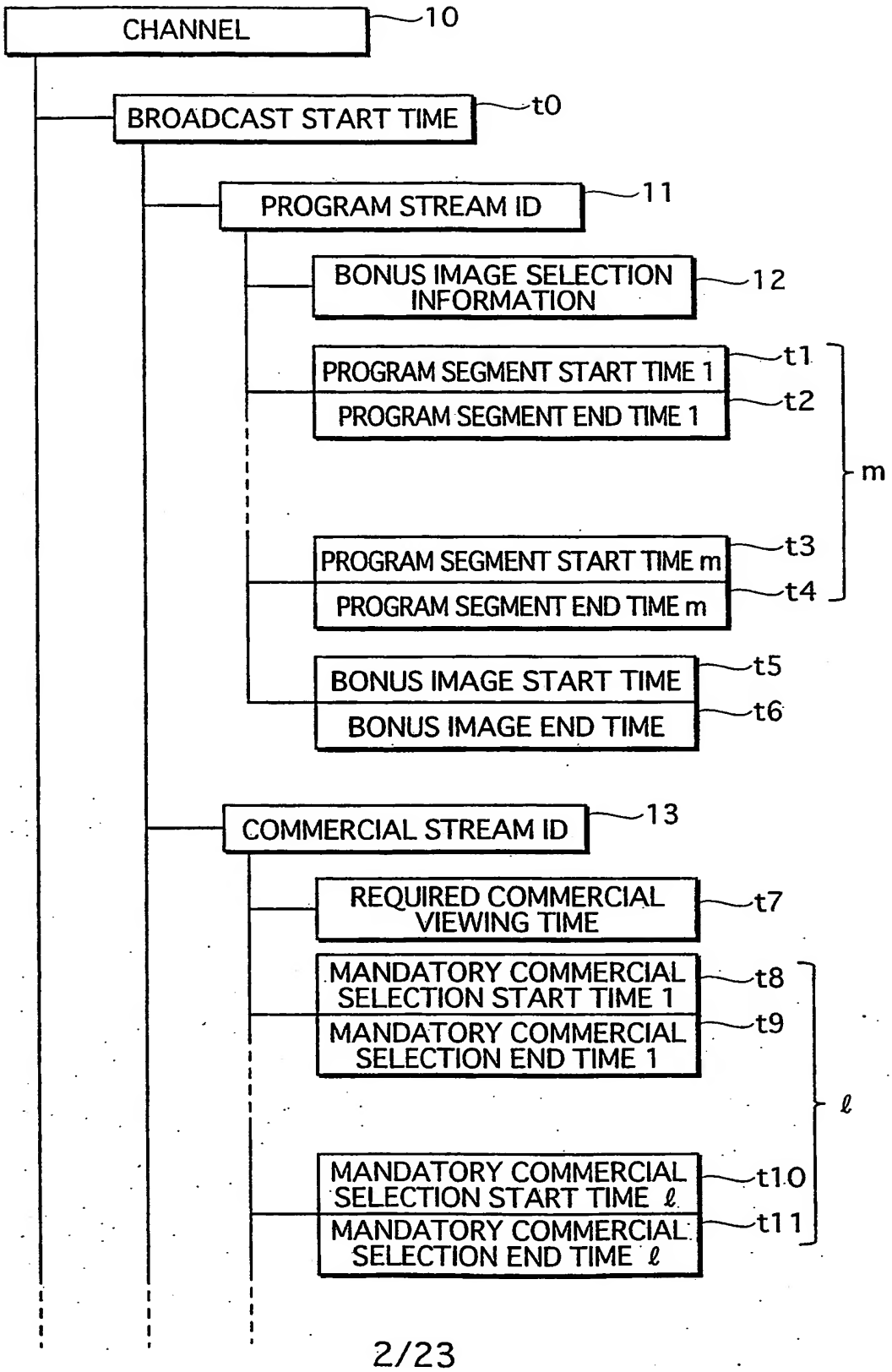

CHANNEL
10
BROADCAST START TIME
t0
PROGRAM STREAM ID
11
BONUS IMAGE SELECTION INFORMATION
12
PROGRAM SEGMENT START TIME 1
t1
PROGRAM SEGMENT END TIME 1
t2
m
PROGRAM SEGMENT START TIME m
t3
PROGRAM SEGMENT END TIME m
t4
BONUS IMAGE START TIME
t5
BONUS IMAGE END TIME
t6
COMMERCIAL STREAM ID
13
REQUIRED COMMERCIAL VIEWING TIME
t7
MANDATORY COMMERCIAL SELECTION START TIME 1
t8
MANDATORY COMMERCIAL SELECTION END TIME 1
t9
ℓ
MANDATORY COMMERCIAL SELECTION START TIME ℓ
t10
MANDATORY COMMERCIAL SELECTION END TIME ℓ
t11

FIG.3

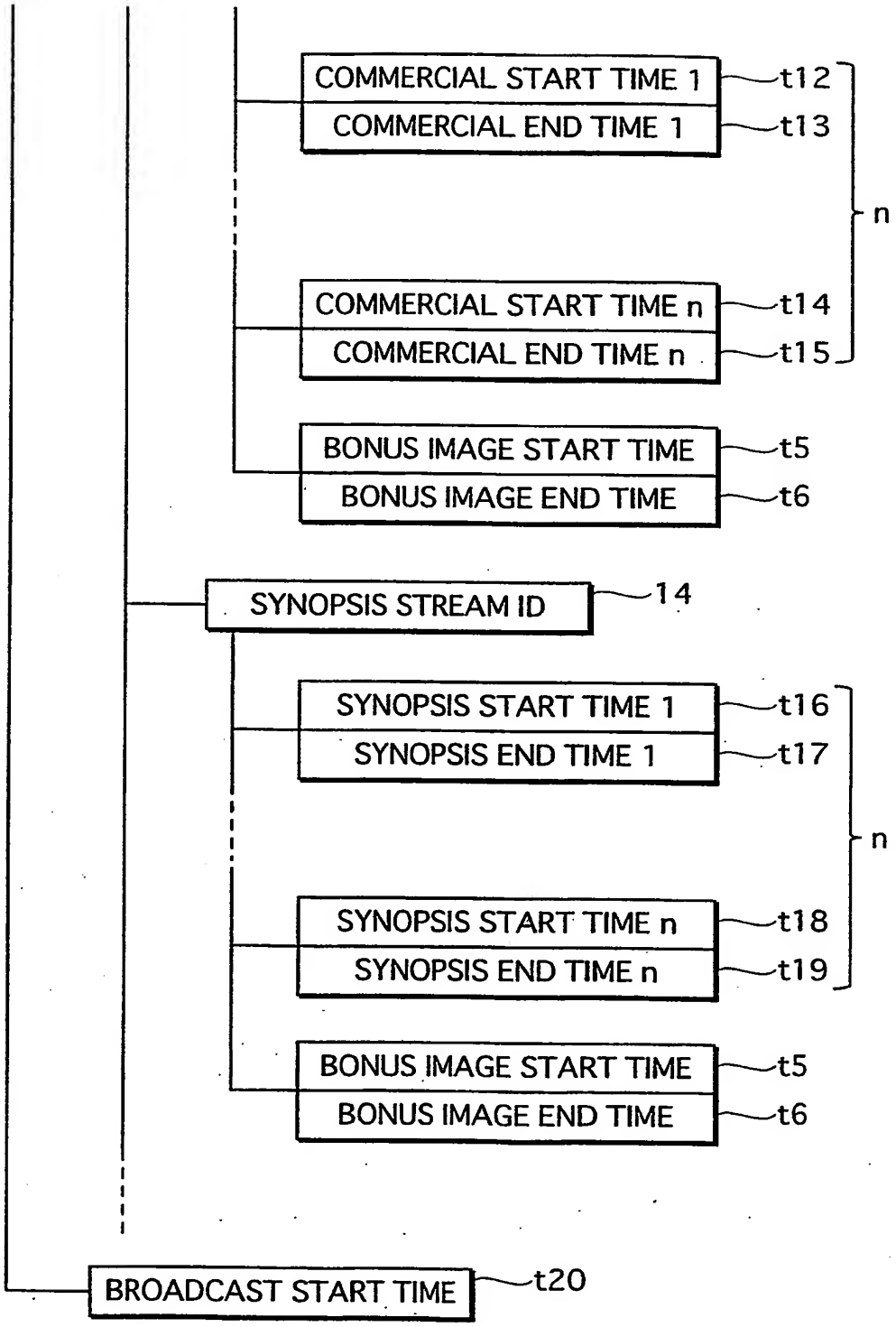

COMMERCIAL START TIME 1
t12
COMMERCIAL END TIME 1
t13
n
COMMERCIAL START TIME n
t14
COMMERCIAL END TIME n
t15
BONUS IMAGE START TIME
t5
BONUS IMAGE END TIME
t6
SYNOPSIS STREAM ID
14
SYNOPSIS START TIME 1
t16
SYNOPSIS END TIME 1
t17
n
SYNOPSIS START TIME n
t18
SYNOPSIS END TIME n
t19
BONUS IMAGE START TIME
t5
BONUS IMAGE END TIME
t6
BROADCAST START TIME
t20

FIG.4

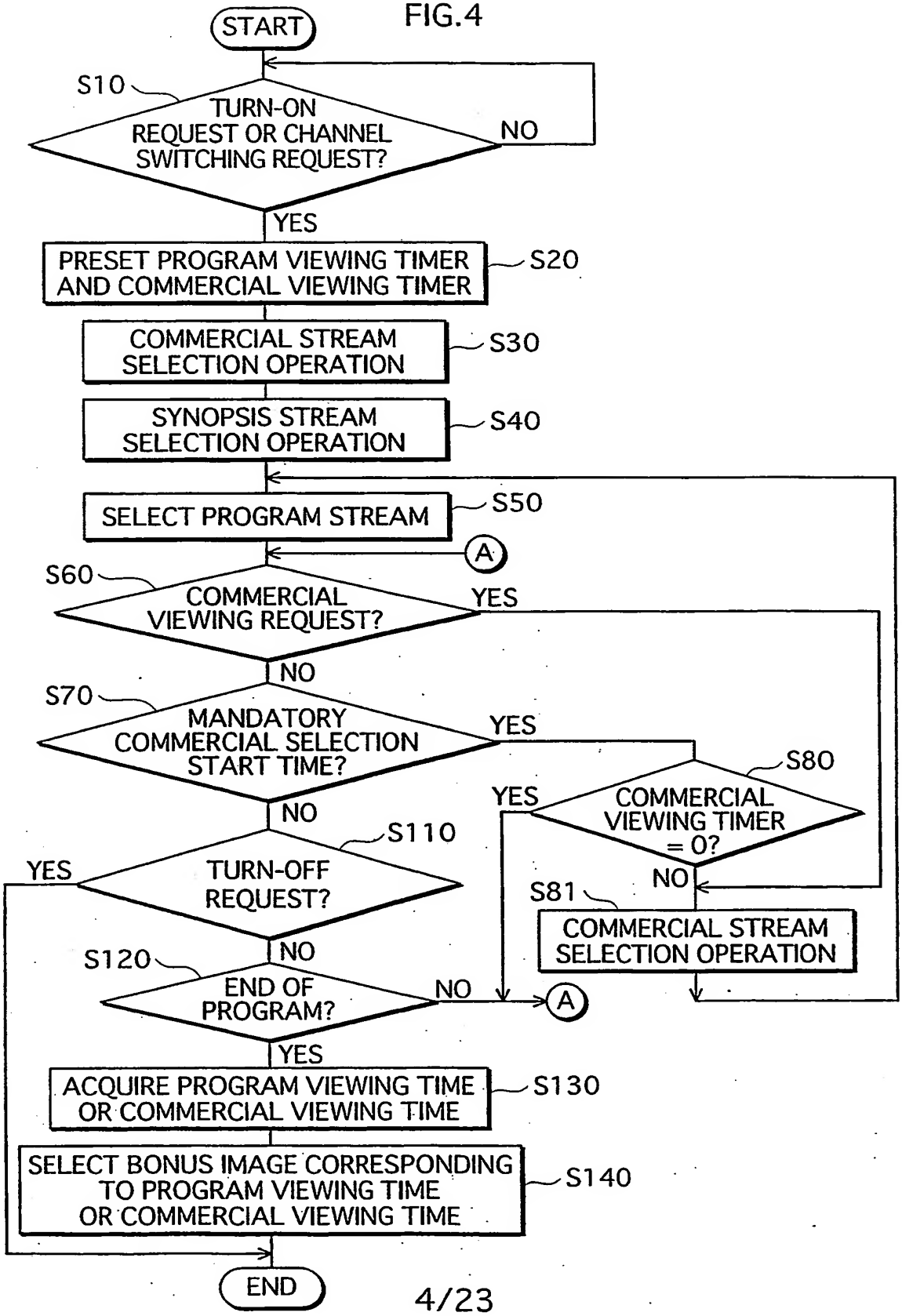

START
S10
TURN-ON REQUEST OR CHANNEL SWITCHING REQUEST?
NO
YES
PRESET PROGRAM VIEWING TIMER AND COMMERCIAL VIEWING TIMER
S20
COMMERCIAL STREAM SELECTION OPERATION
S30
SYNOPSIS STREAM SELECTION OPERATION
S40
SELECT PROGRAM STREAM
S50
A
S60
COMMERCIAL VIEWING REQUEST?
YES
NO
S70
MANDATORY COMMERCIAL SELECTION START TIME?
YES
S80
YES
COMMERCIAL VIEWING TIMER = 0?
NO
S81
COMMERCIAL STREAM SELECTION OPERATION
NO
S110
YES
TURN-OFF REQUEST?
NO
S120
END OF PROGRAM?
NO
A
YES
ACQUIRE PROGRAM VIEWING TIME OR COMMERCIAL VIEWING TIME
S130
SELECT BONUS IMAGE CORRESPONDING TO PROGRAM VIEWING TIME OR COMMERCIAL VIEWING TIME
S140
END

FIG.5

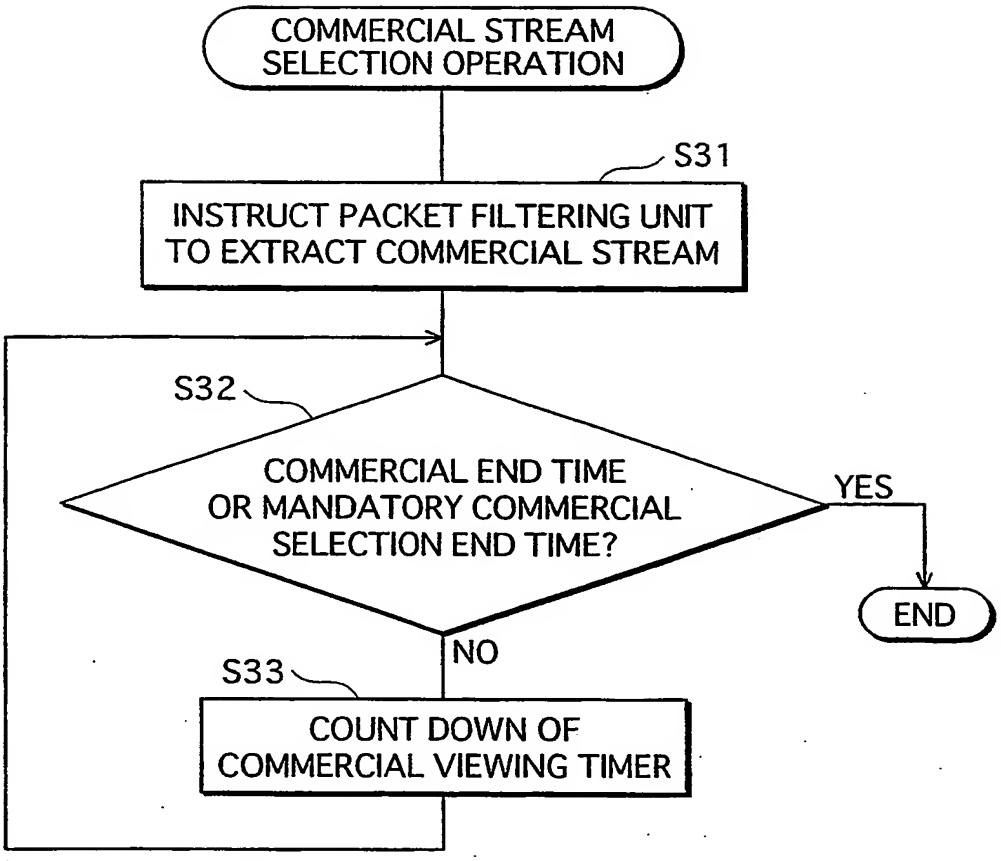

COMMERCIAL STREAM SELECTION OPERATION
S31
INSTRUCT PACKET FILTERING UNIT TO EXTRACT COMMERCIAL STREAM
S32
COMMERCIAL END TIME OR MANDATORY COMMERCIAL SELECTION END TIME?
YES
END
NO
S33
COUNT DOWN OF COMMERCIAL VIEWING TIMER

FIG.6

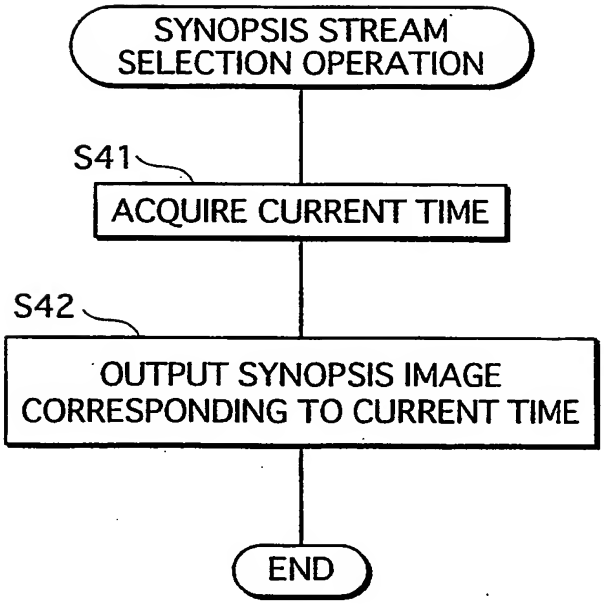

SYNOPSIS STREAM SELECTION OPERATION
S41
ACQUIRE CURRENT TIME
S42
OUTPUT SYNOPSIS IMAGE CORRESPONDING TO CURRENT TIME
END

FIG.7

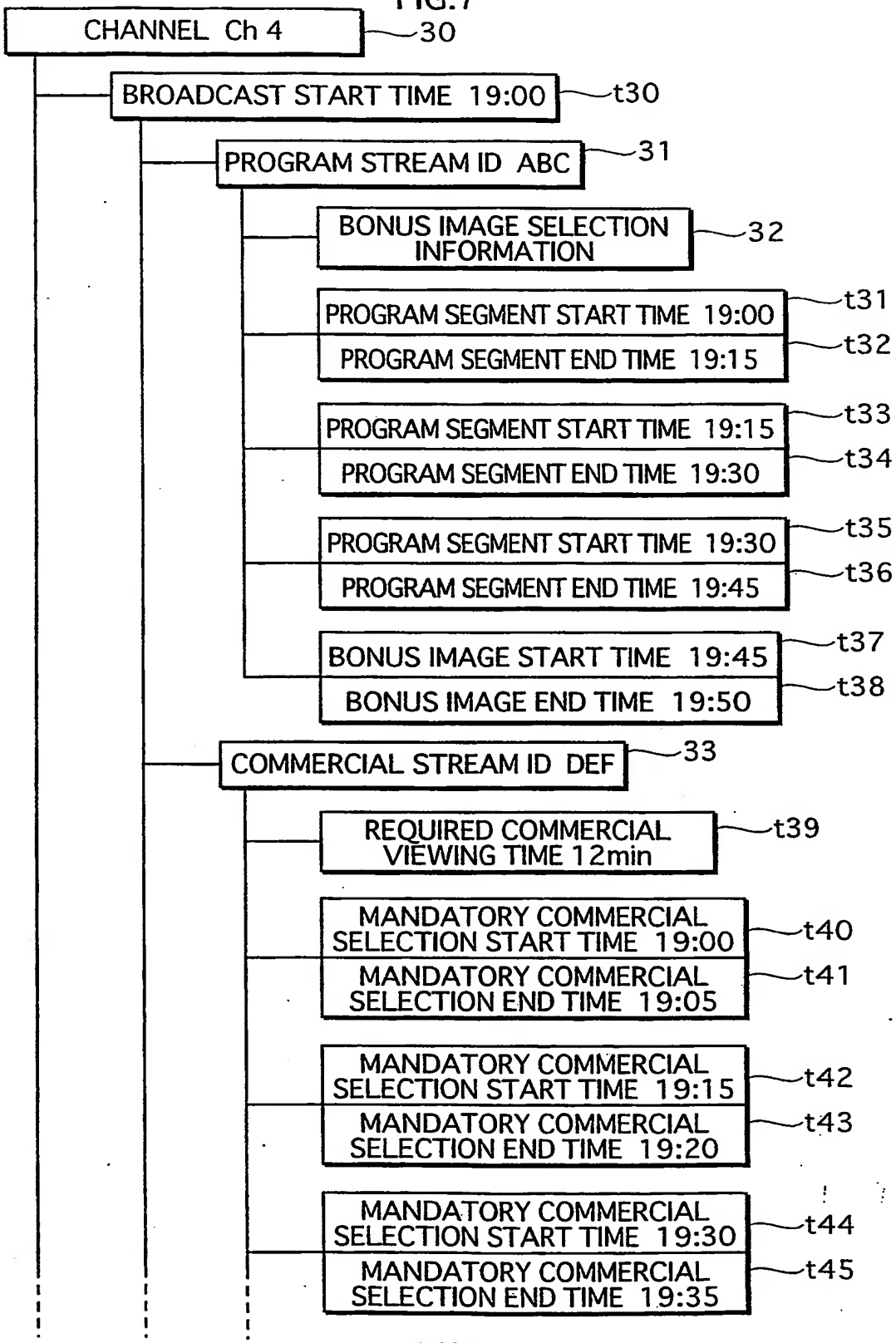

CHANNEL Ch 4
30
BROADCAST START TIME 19:00
t30
PROGRAM STREAM ID ABC
31
BONUS IMAGE SELECTION INFORMATION
32
PROGRAM SEGMENT START TIME 19:00
t31
PROGRAM SEGMENT END TIME 19:15
t32
PROGRAM SEGMENT START TIME 19:15
t33
PROGRAM SEGMENT END TIME 19:30
t34
PROGRAM SEGMENT START TIME 19:30
t35
PROGRAM SEGMENT END TIME 19:45
t36
BONUS IMAGE START TIME 19:45
t37
BONUS IMAGE END TIME 19:50
t38
COMMERCIAL STREAM ID DEF
33
REQUIRED COMMERCIAL VIEWING TIME 12min
t39
MANDATORY COMMERCIAL SELECTION START TIME 19:00
t40
MANDATORY COMMERCIAL SELECTION END TIME 19:05
t41
MANDATORY COMMERCIAL SELECTION START TIME 19:15
t42
MANDATORY COMMERCIAL SELECTION END TIME 19:20
t43
MANDATORY COMMERCIAL SELECTION START TIME 19:30
t44
MANDATORY COMMERCIAL SELECTION END TIME 19:35
t45

FIG.8

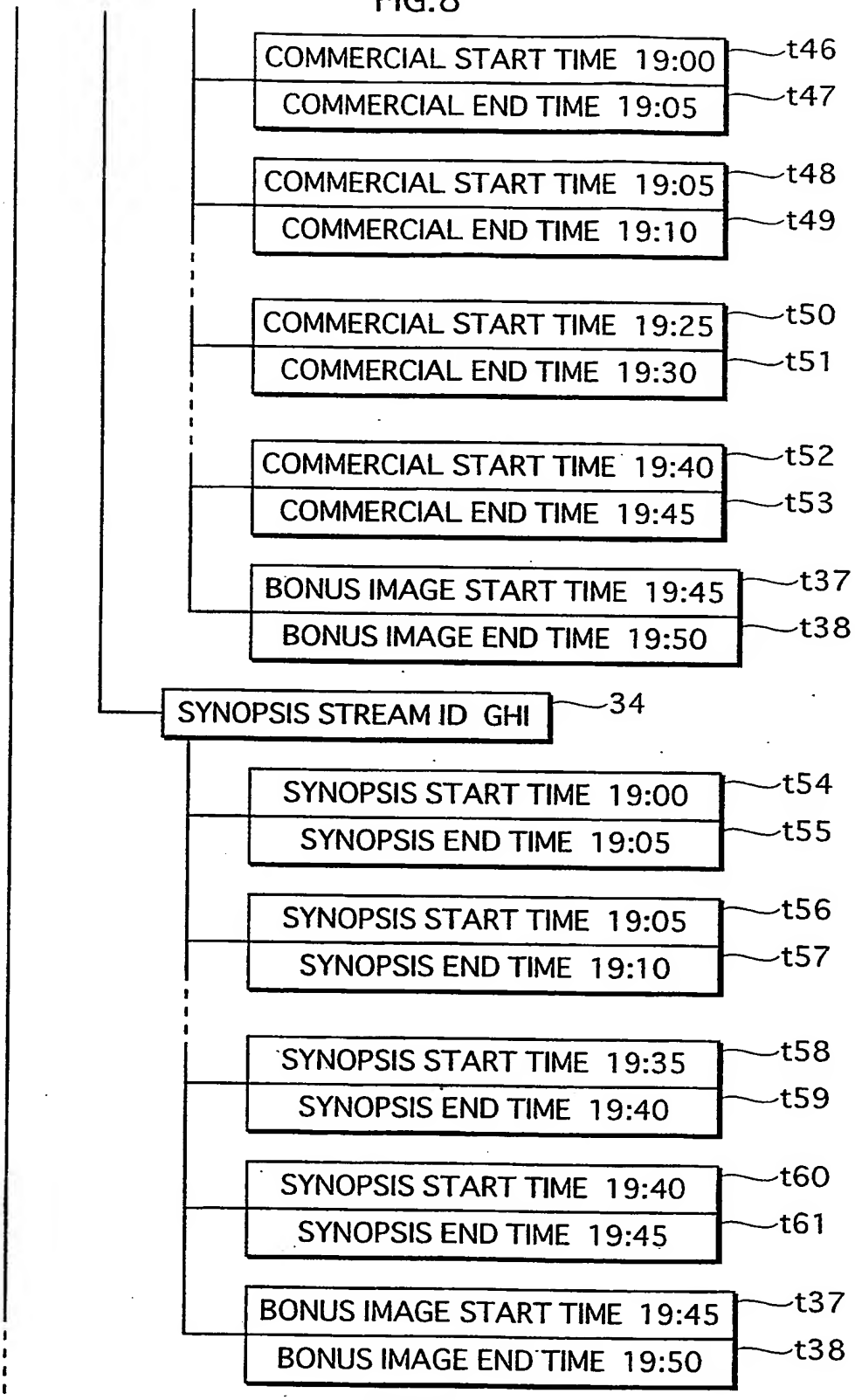

COMMERCIAL START TIME 19:00
t46
COMMERCIAL END TIME 19:05
t47
COMMERCIAL START TIME 19:05
t48
COMMERCIAL END TIME 19:10
t49
COMMERCIAL START TIME 19:25
t50
COMMERCIAL END TIME 19:30
t51
COMMERCIAL START TIME 19:40
t52
COMMERCIAL END TIME 19:45
t53
BONUS IMAGE START TIME 19:45
t37
BONUS IMAGE END TIME 19:50
t38
SYNOPSIS STREAM ID GHI
34
SYNOPSIS START TIME 19:00
t54
SYNOPSIS END TIME 19:05
t55
SYNOPSIS START TIME 19:05
t56
SYNOPSIS END TIME 19:10
t57
SYNOPSIS START TIME 19:35
t58
SYNOPSIS END TIME 19:40
t59
SYNOPSIS START TIME 19:40
t60
SYNOPSIS END TIME 19:45
t61
BONUS IMAGE START TIME 19:45
t37
BONUS IMAGE END TIME 19:50
t38

FIG.9

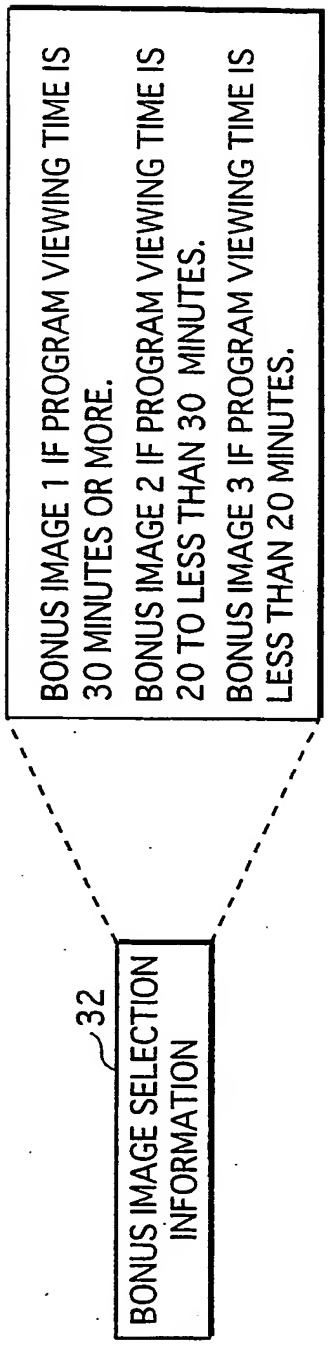

BONUS IMAGE 1 IF PROGRAM VIEWING TIME IS 30 MINUTES OR MORE.
BONUS IMAGE 2 IF PROGRAM VIEWING TIME IS 20 TO LESS THAN 30 MINUTES.
BONUS IMAGE 3 IF PROGRAM VIEWING TIME IS LESS THAN 20 MINUTES.
32
BONUS IMAGE SELECTION INFORMATION

FIG.10

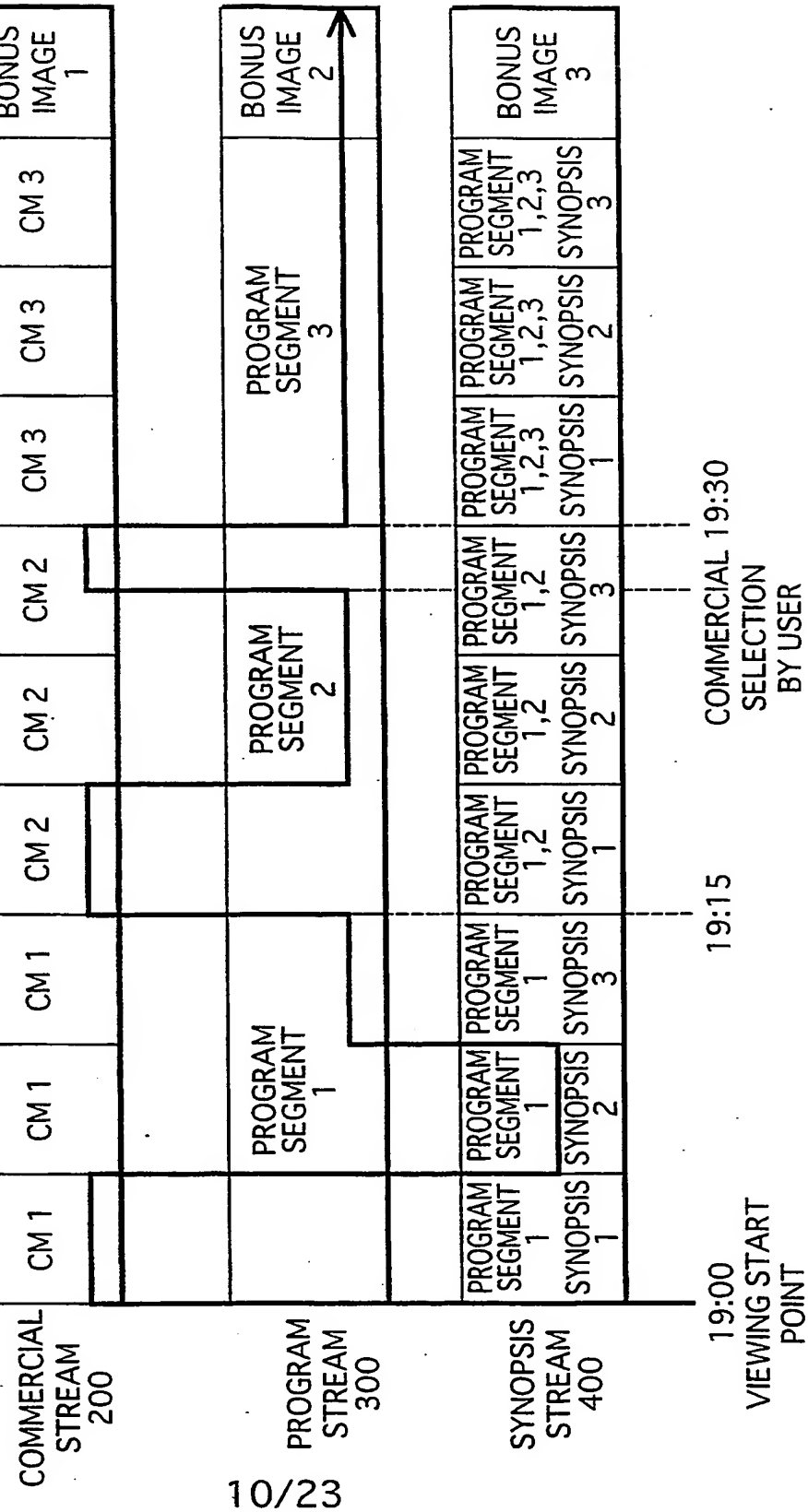

t40
t41
t42
t43
t44
t45
COMMERCIAL STREAM 200
PROGRAM STREAM 300
SYNOPSIS STREAM 400
CM 1
CM 2
CM 3
BONUS IMAGE 1
BONUS IMAGE 2
BONUS IMAGE 3
PROGRAM SEGMENT 1
PROGRAM SEGMENT 2
PROGRAM SEGMENT 3
SYNOPSIS 1
SYNOPSIS 2
SYNOPSIS 3
PROGRAM SEGMENT 1,2
PROGRAM SEGMENT 1,2,3
19:00 VIEWING START POINT
19:15
COMMERCIAL 19:30 SELECTION BY USER

FIG.11

800 SELECTED CHANNEL	801 SELECTED CHANNEL VIEWING START TIME	802 TOTAL VIEWING TIME (min)
Ch 3	18/09/2003 19:10	50
⋮	⋮	⋮

FIG.12

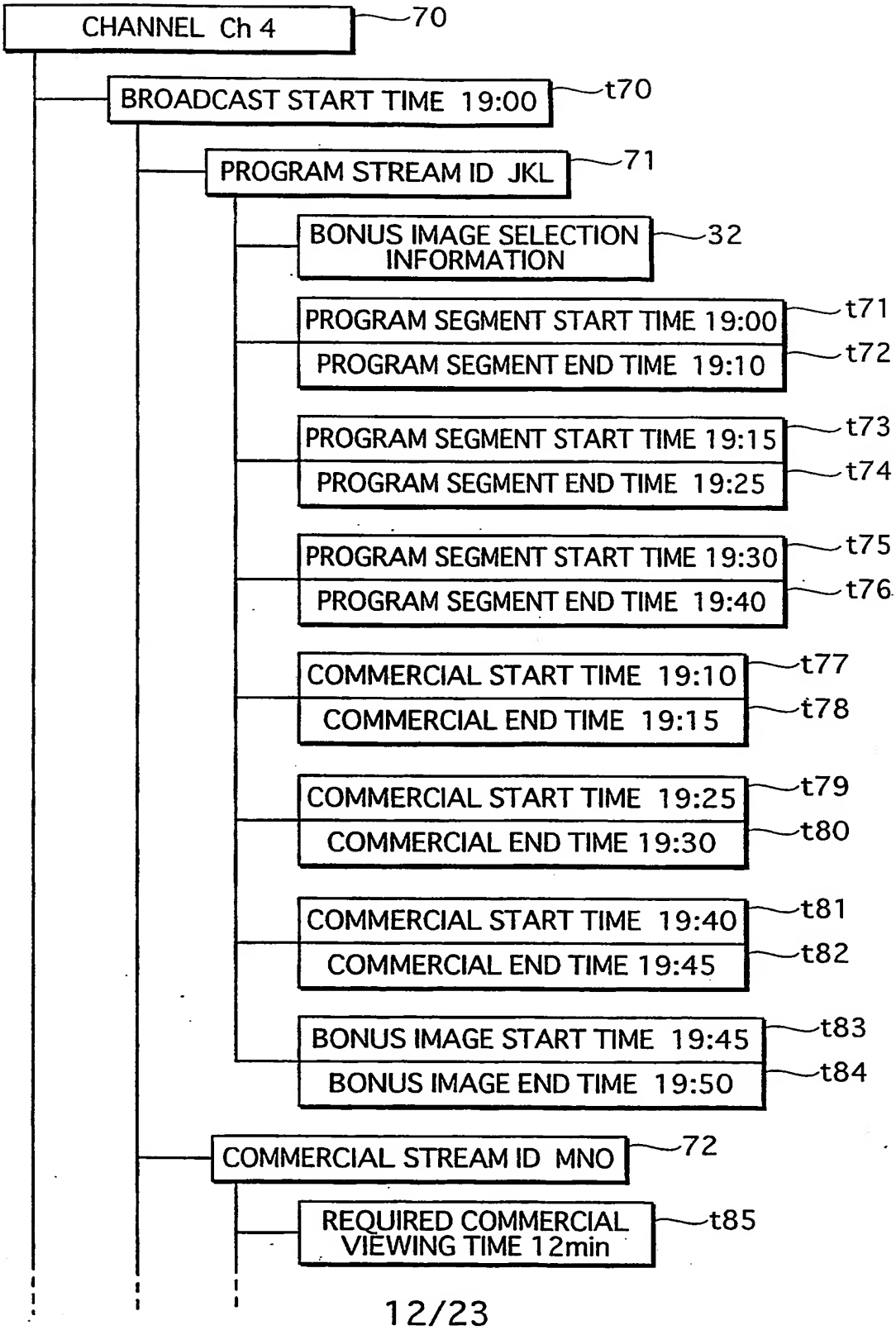

CHANNEL Ch 4
70
BROADCAST START TIME 19:00
t70
PROGRAM STREAM ID JKL
71
BONUS IMAGE SELECTION INFORMATION
32
PROGRAM SEGMENT START TIME 19:00
t71
PROGRAM SEGMENT END TIME 19:10
t72
PROGRAM SEGMENT START TIME 19:15
t73
PROGRAM SEGMENT END TIME 19:25
t74
PROGRAM SEGMENT START TIME 19:30
t75
PROGRAM SEGMENT END TIME 19:40
t76
COMMERCIAL START TIME 19:10
t77
COMMERCIAL END TIME 19:15
t78
COMMERCIAL START TIME 19:25
t79
COMMERCIAL END TIME 19:30
t80
COMMERCIAL START TIME 19:40
t81
COMMERCIAL END TIME 19:45
t82
BONUS IMAGE START TIME 19:45
t83
BONUS IMAGE END TIME 19:50
t84
COMMERCIAL STREAM ID MNO
72
REQUIRED COMMERCIAL VIEWING TIME 12min
t85

FIG.13

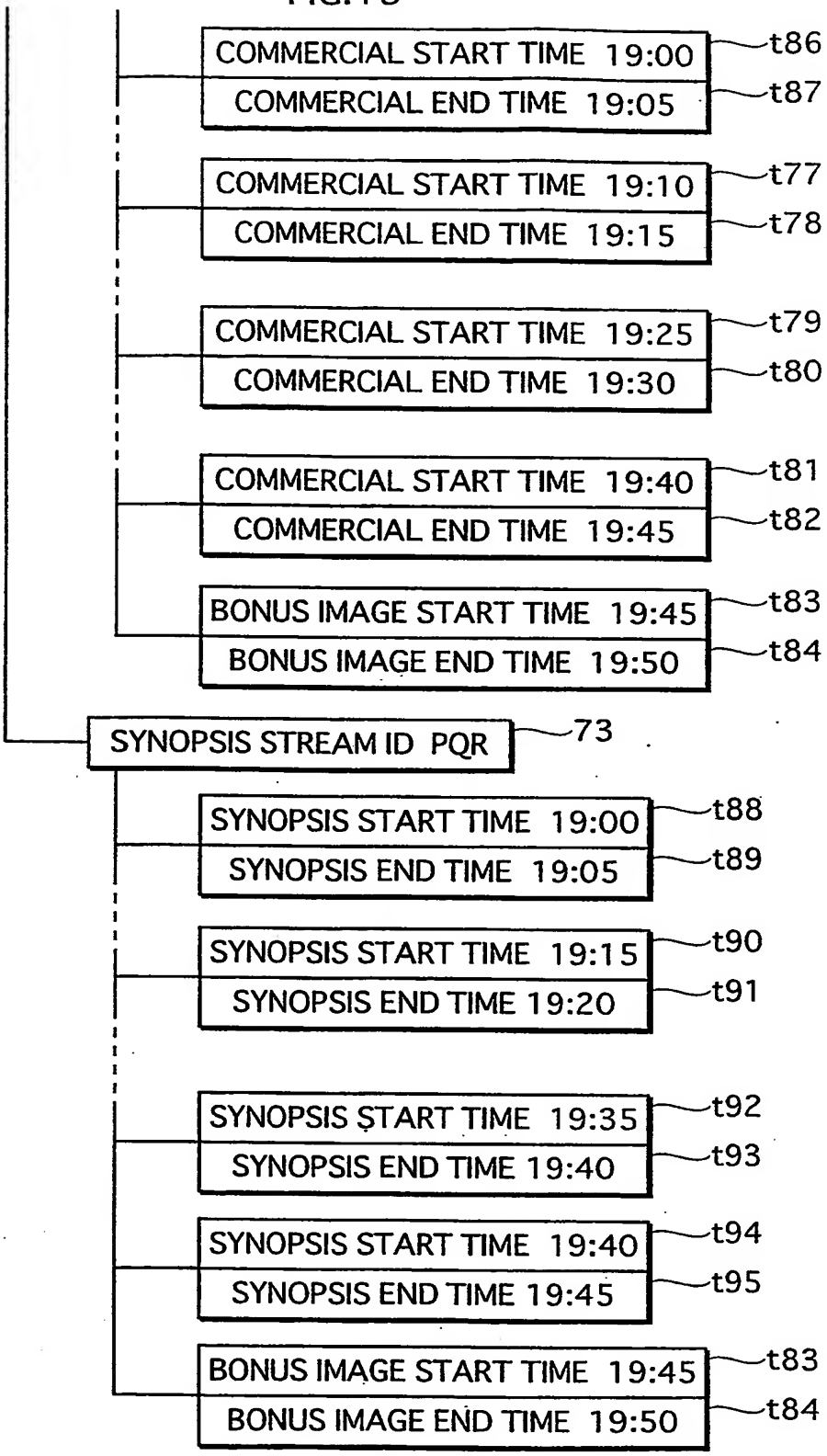

COMMERCIAL START TIME 19:00
t86
COMMERCIAL END TIME 19:05
t87
COMMERCIAL START TIME 19:10
t77
COMMERCIAL END TIME 19:15
t78
COMMERCIAL START TIME 19:25
t79
COMMERCIAL END TIME 19:30
t80
COMMERCIAL START TIME 19:40
t81
COMMERCIAL END TIME 19:45
t82
BONUS IMAGE START TIME 19:45
t83
BONUS IMAGE END TIME 19:50
t84
SYNOPSIS STREAM ID PQR
73
SYNOPSIS START TIME 19:00
t88
SYNOPSIS END TIME 19:05
t89
SYNOPSIS START TIME 19:15
t90
SYNOPSIS END TIME 19:20
t91
SYNOPSIS START TIME 19:35
t92
SYNOPSIS END TIME 19:40
t93
SYNOPSIS START TIME 19:40
t94
SYNOPSIS END TIME 19:45
t95
BONUS IMAGE START TIME 19:45
t83
BONUS IMAGE END TIME 19:50
t84

FIG.14

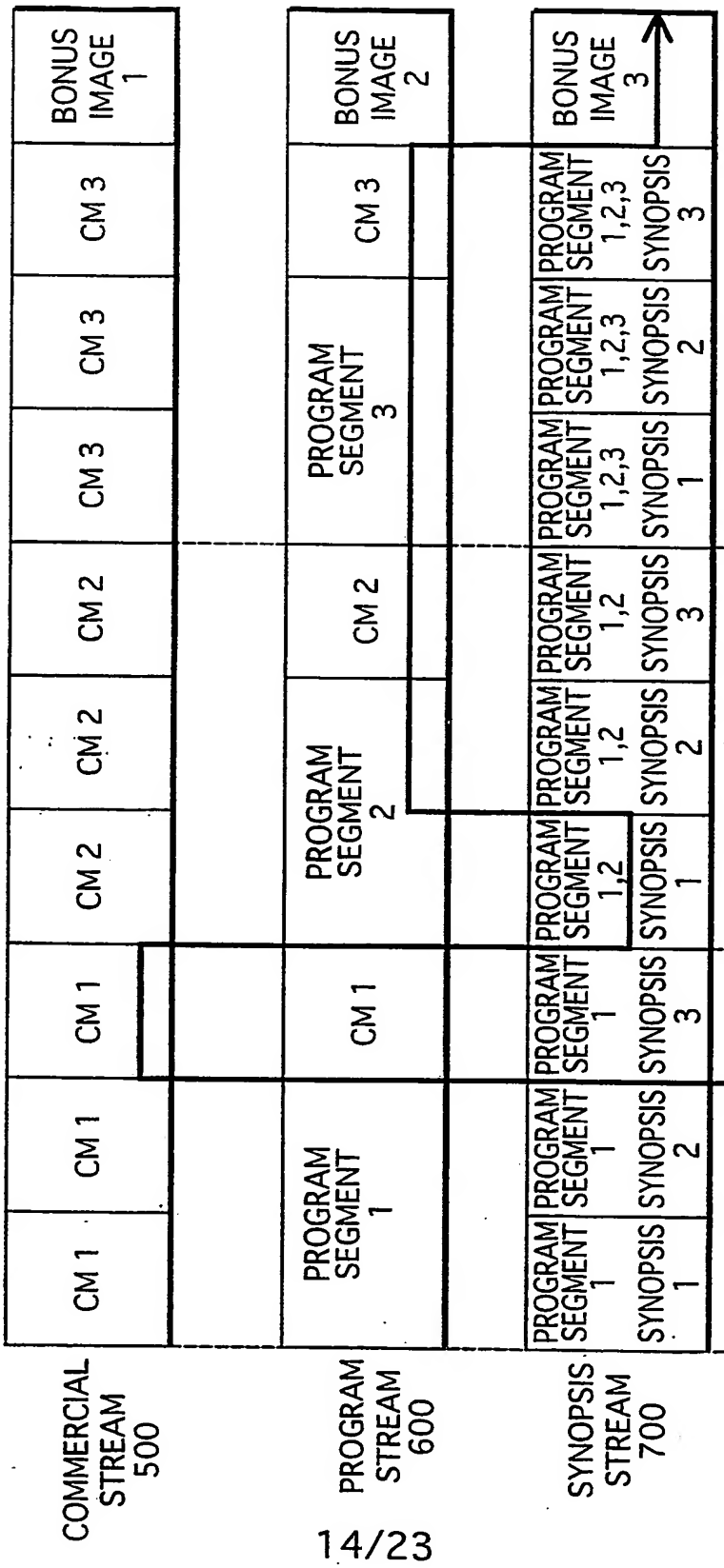

COMMERCIAL STREAM 500
PROGRAM STREAM 600
SYNOPSIS STREAM 700
CM 1
CM 2
CM 3
BONUS IMAGE 1
BONUS IMAGE 2
BONUS IMAGE 3
PROGRAM SEGMENT 1
PROGRAM SEGMENT 2
PROGRAM SEGMENT 3
PROGRAM SEGMENT 1
PROGRAM SEGMENT 1,2
PROGRAM SEGMENT 1,2,3
SYNOPSIS 1
SYNOPSIS 2
SYNOPSIS 3
19:00
19:15
19:30
VIEWING START POINT

FIG.15

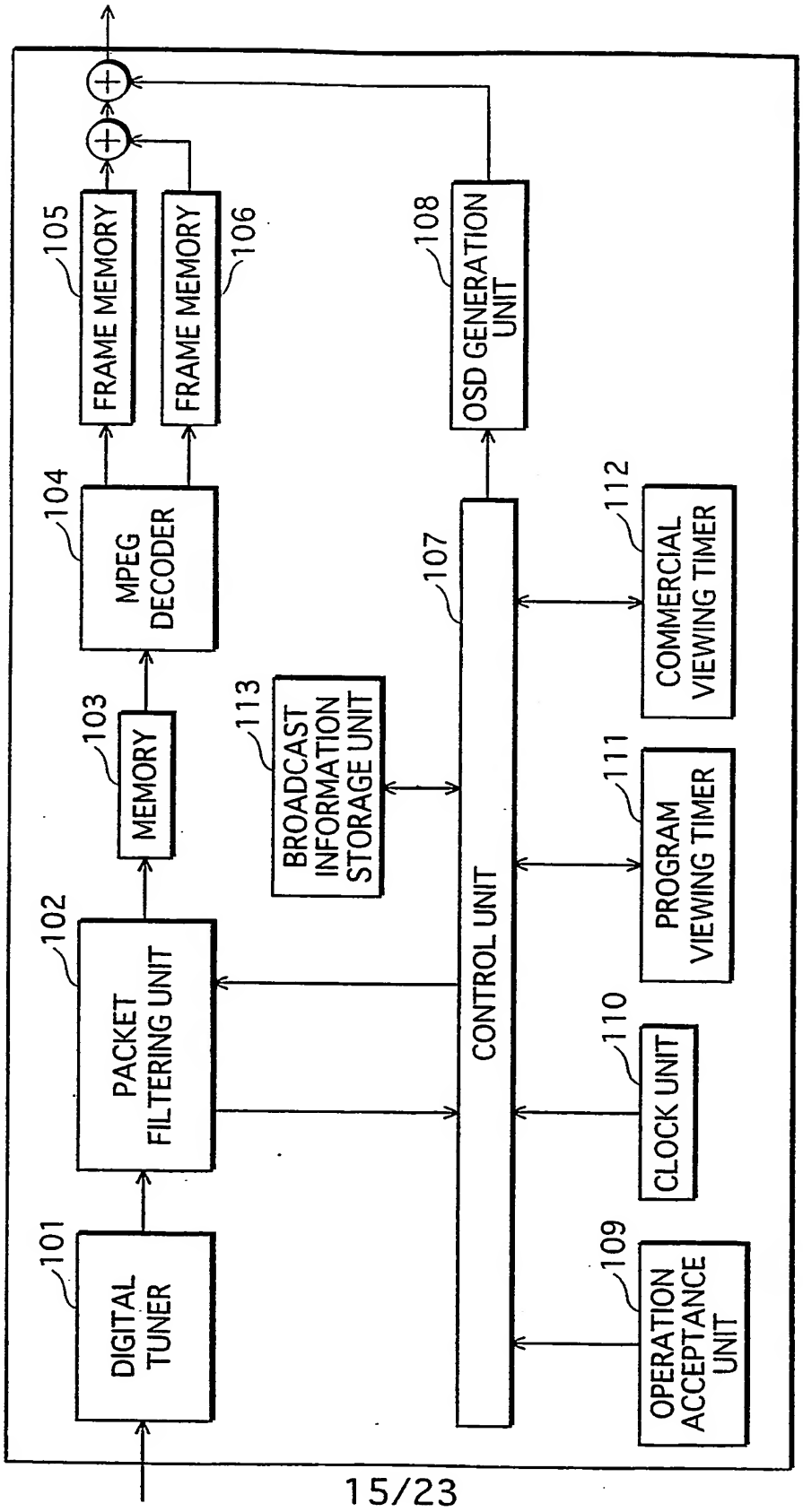

DIGITAL TUNER
101
PACKET FILTERING UNIT
102
MEMORY
103
MPEG DECODER
104
FRAME MEMORY
105
FRAME MEMORY
106
OSD GENERATION UNIT
108
BROADCAST INFORMATION STORAGE UNIT
113
CONTROL UNIT
107
CLOCK UNIT
110
OPERATION ACCEPTANCE UNIT
109
PROGRAM VIEWING TIMER
111
COMMERCIAL VIEWING TIMER
112

FIG.16

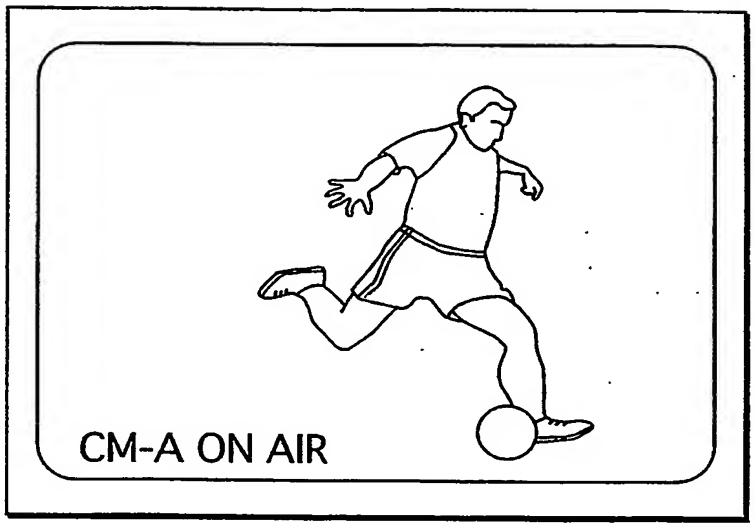


FIG.17

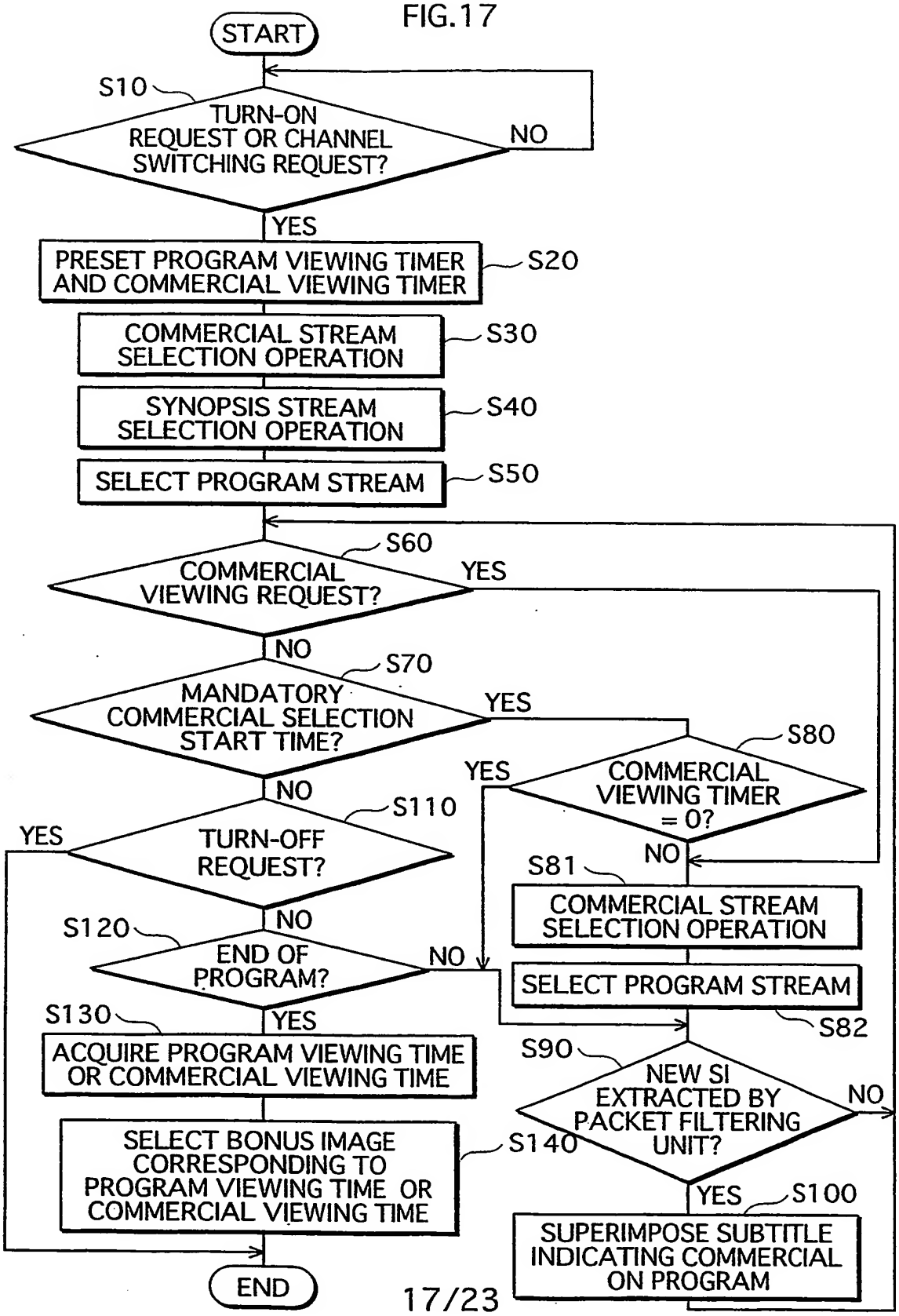

START
S10
TURN-ON REQUEST OR CHANNEL SWITCHING REQUEST?
NO
YES
PRESET PROGRAM VIEWING TIMER AND COMMERCIAL VIEWING TIMER
S20
COMMERCIAL STREAM SELECTION OPERATION
S30
SYNOPSIS STREAM SELECTION OPERATION
S40
SELECT PROGRAM STREAM
S50
S60
COMMERCIAL VIEWING REQUEST?
YES
NO
S70
MANDATORY COMMERCIAL SELECTION START TIME?
YES
NO
S80
YES
COMMERCIAL VIEWING TIMER = 0?
NO
S110
YES
TURN-OFF REQUEST?
NO
S81
COMMERCIAL STREAM SELECTION OPERATION
S120
END OF PROGRAM?
NO
SELECT PROGRAM STREAM
S82
S130
YES
ACQUIRE PROGRAM VIEWING TIME OR COMMERCIAL VIEWING TIME
S90
NEW SI EXTRACTED BY PACKET FILTERING UNIT?
NO
SELECT BONUS IMAGE CORRESPONDING TO PROGRAM VIEWING TIME OR COMMERCIAL VIEWING TIME
S140
YES
S100
SUPERIMPOSE SUBTITLE INDICATING COMMERCIAL ON PROGRAM
END

FIG.18

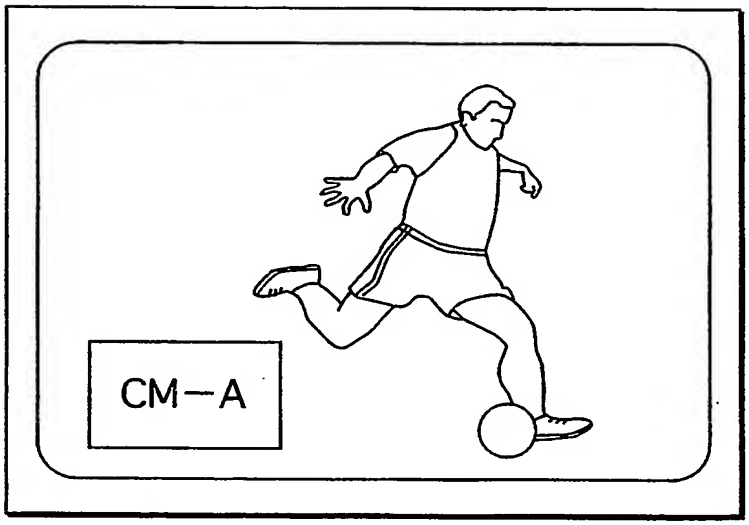


FIG.19

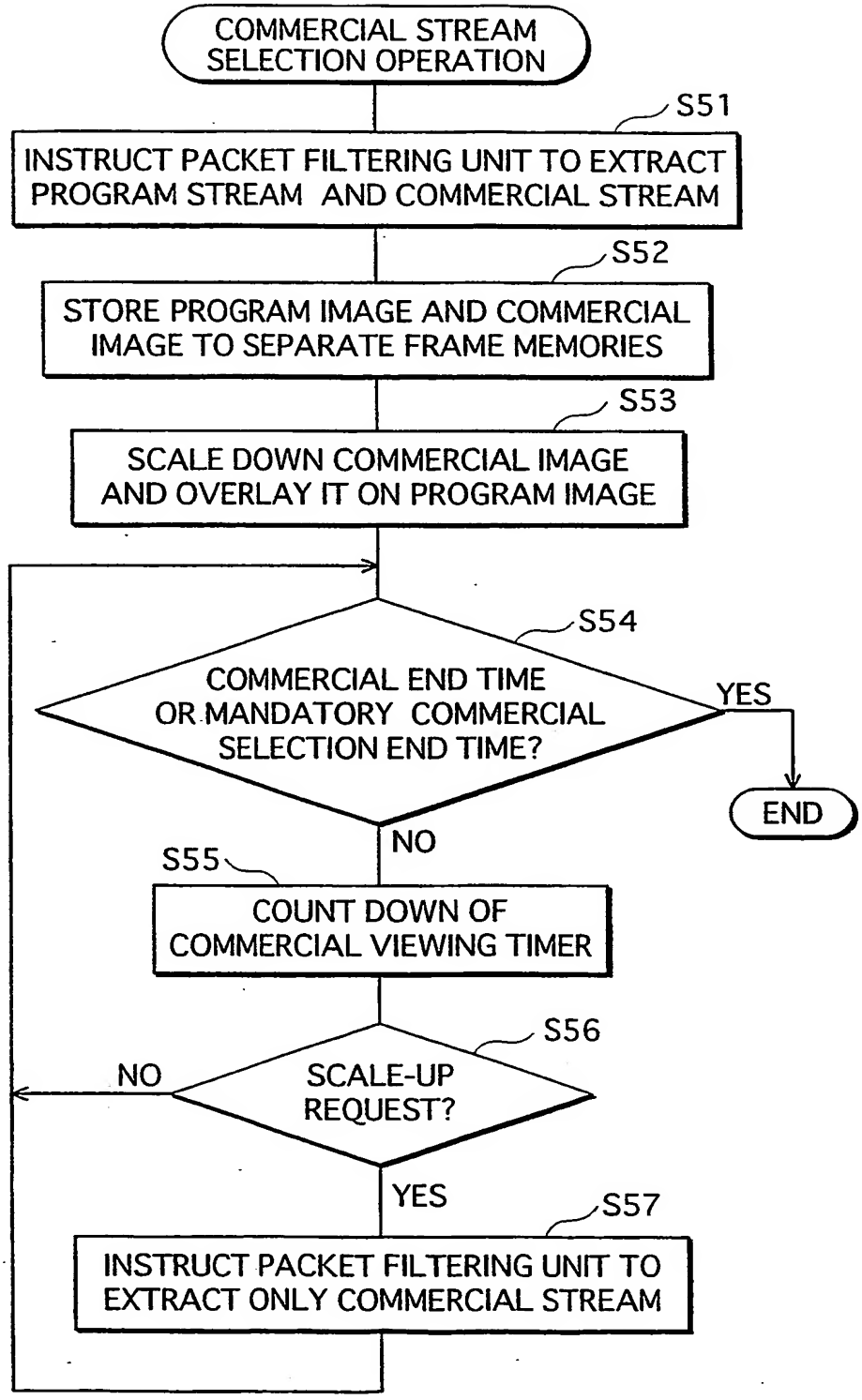

COMMERCIAL STREAM SELECTION OPERATION
S51
INSTRUCT PACKET FILTERING UNIT TO EXTRACT PROGRAM STREAM AND COMMERCIAL STREAM
S52
STORE PROGRAM IMAGE AND COMMERCIAL IMAGE TO SEPARATE FRAME MEMORIES
S53
SCALE DOWN COMMERCIAL IMAGE AND OVERLAY IT ON PROGRAM IMAGE
S54
COMMERCIAL END TIME OR MANDATORY COMMERCIAL SELECTION END TIME?
YES
END
NO
S55
COUNT DOWN OF COMMERCIAL VIEWING TIMER
S56
SCALE-UP REQUEST?
NO
YES
S57
INSTRUCT PACKET FILTERING UNIT TO EXTRACT ONLY COMMERCIAL STREAM

FIG.20

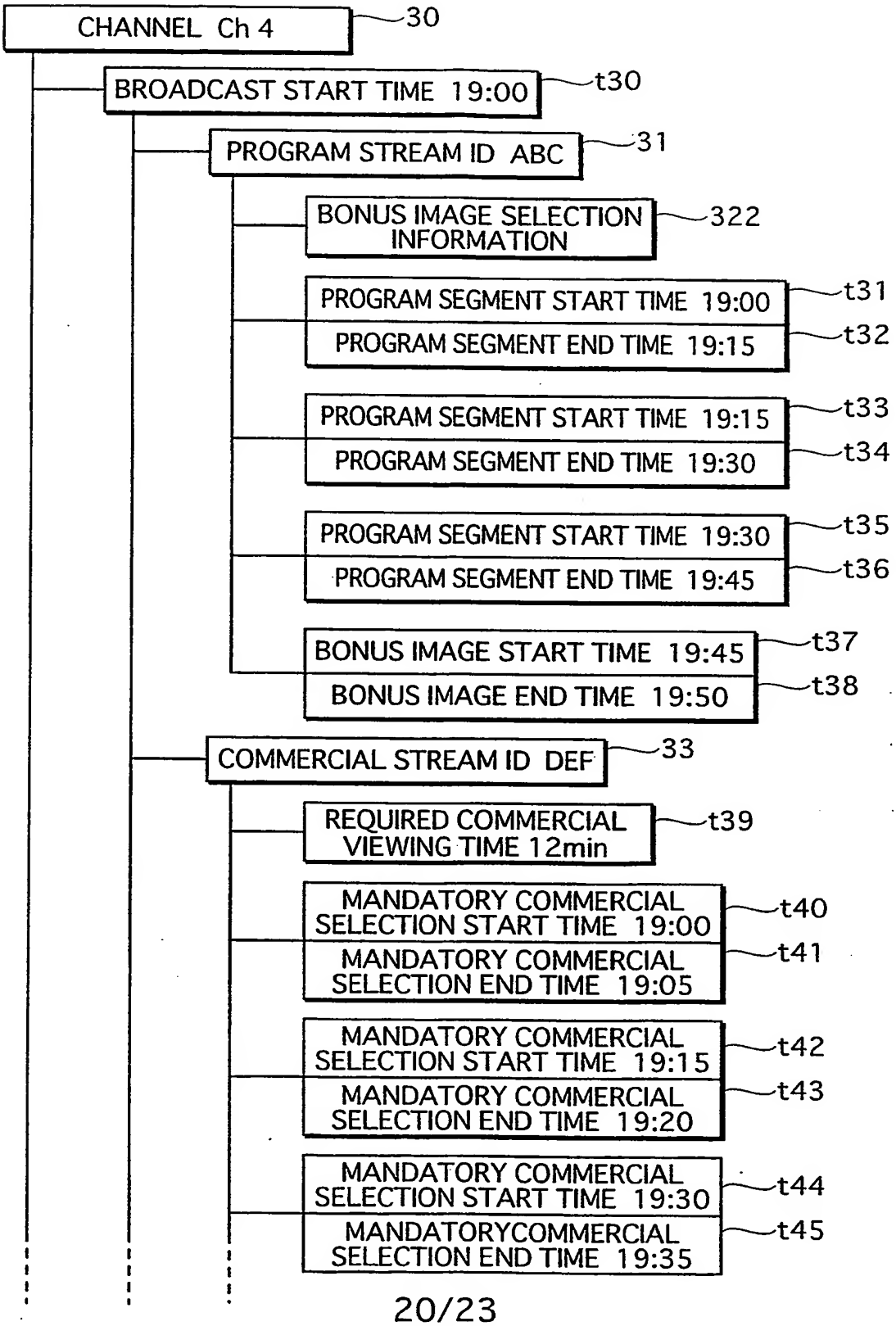

CHANNEL Ch 4
30
BROADCAST START TIME 19:00
t30
PROGRAM STREAM ID ABC
31
BONUS IMAGE SELECTION INFORMATION
322
PROGRAM SEGMENT START TIME 19:00
t31
PROGRAM SEGMENT END TIME 19:15
t32
PROGRAM SEGMENT START TIME 19:15
t33
PROGRAM SEGMENT END TIME 19:30
t34
PROGRAM SEGMENT START TIME 19:30
t35
PROGRAM SEGMENT END TIME 19:45
t36
BONUS IMAGE START TIME 19:45
t37
BONUS IMAGE END TIME 19:50
t38
COMMERCIAL STREAM ID DEF
33
REQUIRED COMMERCIAL VIEWING TIME 12min
t39
MANDATORY COMMERCIAL SELECTION START TIME 19:00
t40
MANDATORY COMMERCIAL SELECTION END TIME 19:05
t41
MANDATORY COMMERCIAL SELECTION START TIME 19:15
t42
MANDATORY COMMERCIAL SELECTION END TIME 19:20
t43
MANDATORY COMMERCIAL SELECTION START TIME 19:30
t44
MANDATORYCOMMERCIAL SELECTION END TIME 19:35
t45

FIG.21

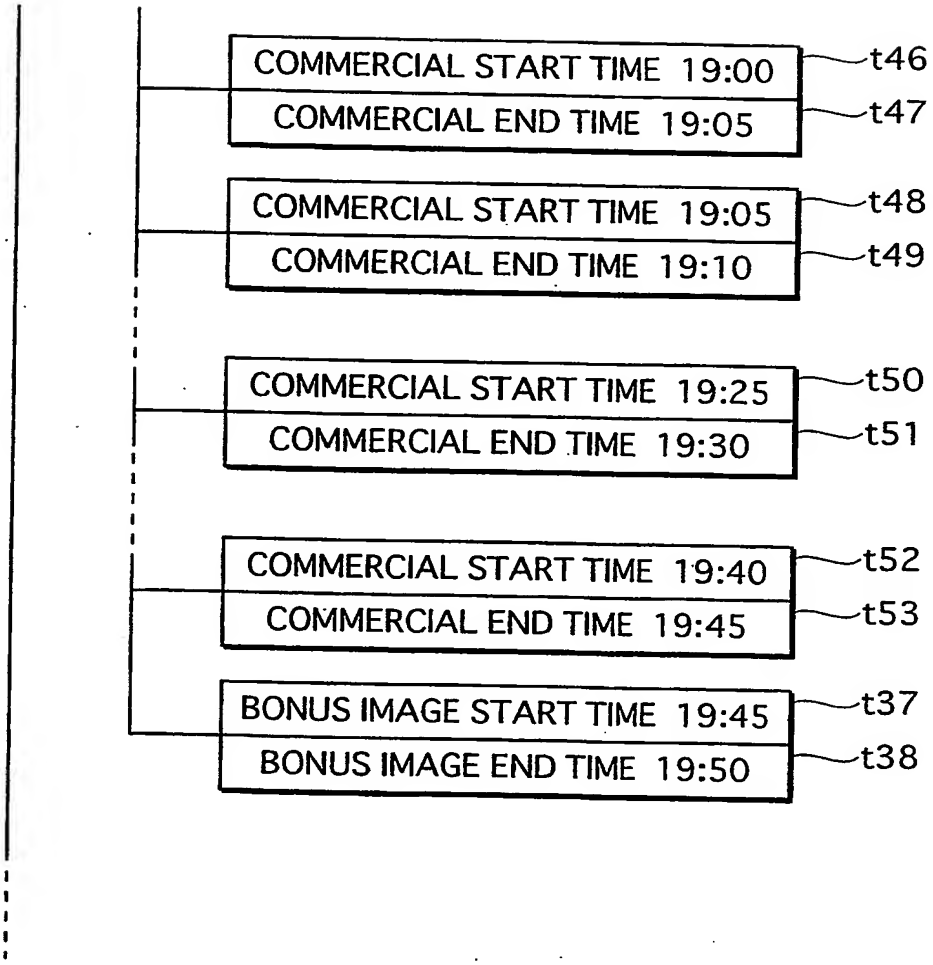

COMMERCIAL START TIME 19:00
t46
COMMERCIAL END TIME 19:05
t47
COMMERCIAL START TIME 19:05
t48
COMMERCIAL END TIME 19:10
t49
COMMERCIAL START TIME 19:25
t50
COMMERCIAL END TIME 19:30
t51
COMMERCIAL START TIME 19:40
t52
COMMERCIAL END TIME 19:45
t53
BONUS IMAGE START TIME 19:45
t37
BONUS IMAGE END TIME 19:50
t38

FIG.22

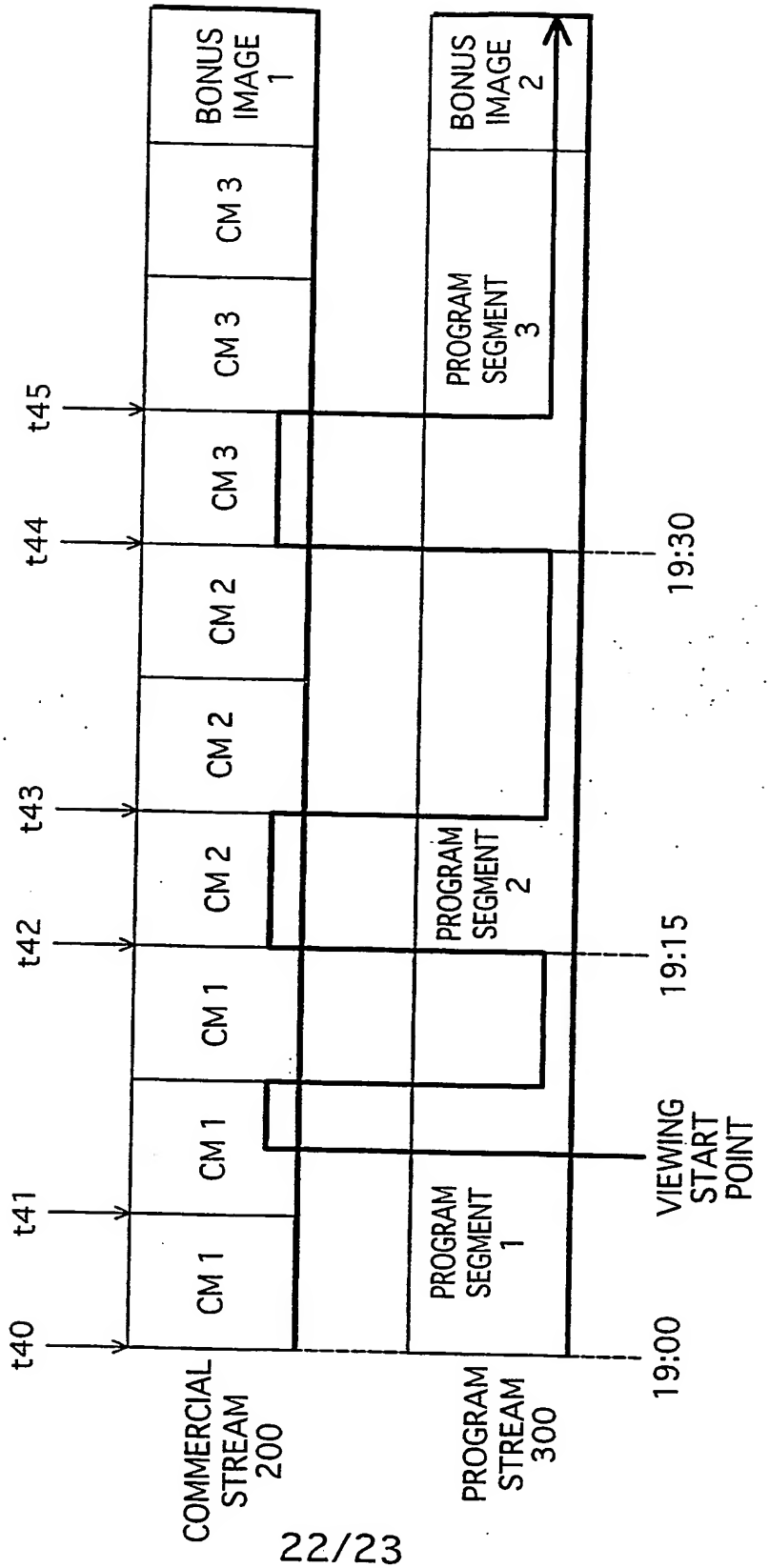
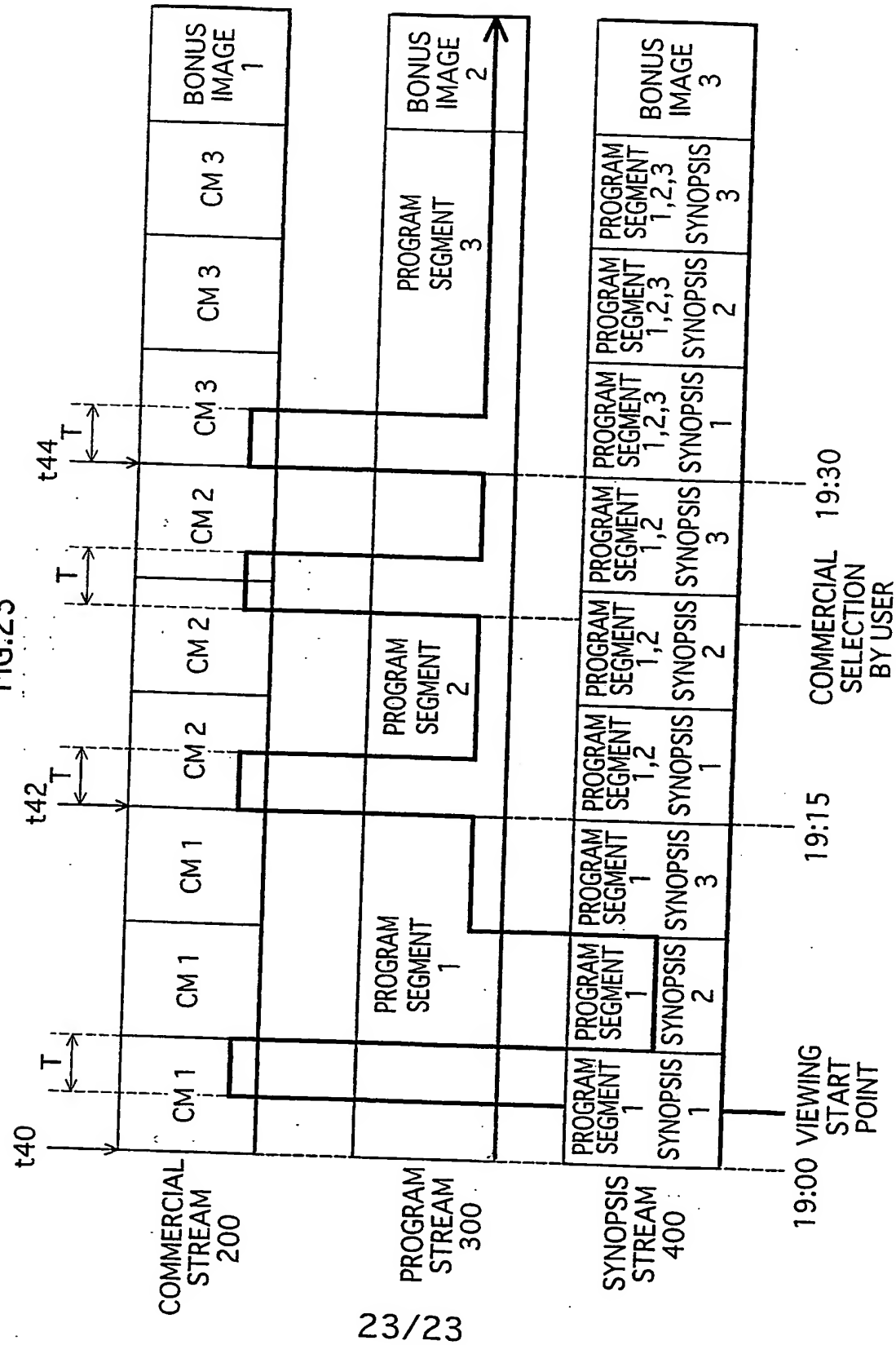

t40
t41
t42
t43
t44
t45
19:00
19:15
19:30
CM 1
CM 1
CM 1
CM 2
CM 2
CM 3
CM 3
CM 3
BONUS IMAGE 1
PROGRAM SEGMENT 1
PROGRAM SEGMENT 2
PROGRAM SEGMENT 3
BONUS IMAGE 2
VIEWING START POINT
COMMERCIAL STREAM 200
PROGRAM STREAM 300

FIG.23


t40
t42
t44
T
T
T
CM 1
CM 2
CM 3
BONUS IMAGE 1
BONUS IMAGE 2
BONUS IMAGE 3
PROGRAM SEGMENT 1
PROGRAM SEGMENT 2
PROGRAM SEGMENT 3
SYNOPSIS 1
SYNOPSIS 2
SYNOPSIS 3
PROGRAM SEGMENT 1,2
PROGRAM SEGMENT 1,2,3
19:00 VIEWING START POINT
19:15
19:30 COMMERCIAL SELECTION BY USER
COMMERCIAL STREAM 200
PROGRAM STREAM 300
SYNOPSIS STREAM 400